Identification of small-scale industrial clusters for CDM projects – A base-line study

Prepared for New Energy & Industrial Technology Development Organization (NEDO), Bangkok (Thailand)

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Executive summary

Small-scale industry (SSI) sector play a key role in triggering and sustaining economic growth and equitable development in developing countries like India. The very notion that small industries should be the focus of economic development programmes, highlights their importance in models of "bottom-up" growth and increased employment. Added benefits of these programmes include greater social and political stability. Consequently, over the past five decades, a number of new programmes and policy initiatives have been undertaken by the government to develop a modern small-scale industry sector in the country. As a result, the sector has emerged as a dynamic and vibrant partner in the process of development by consistently recording higher levels of growth as compared to overall industrial growth. With an employment generation of 18 million persons, 40% of industrial production, 7% of Gross National Product, 35% of direct exports and an unmistakable contribution towards the dispersal of industrial development, small-scale industry today is significantly important for Indian economy.

However, this focus on SSIs does not overlook their intrinsic limitations. The potential role of SSIs is often not fulfilled because of a particular set of problems characterizing them, which are related to their size. Individually, SSIs are often unable to capture market opportunities, which require large production quantities, homogenous standards, and regular supply. By the same token, they experience difficulties in achieving economics of scale in the purchase of inputs, such as equipment, raw materials, finance, consulting services, etc. Small size also constitute a significant hindrance to the internationalization of functions such as training, market intelligence, logistics and technology innovation – all of which are at the very core of firm dynamism. Finally, because of the continuous struggle to preserve their narrow profit margins, small-scale entrepreneurs often locked in their routines and unable to introduce innovative improvements to their products and processes and look beyond the boundaries of their firms to capture new market opportunities.

Some of the other significant challenges faced by the sector today are related to technological obsolescence, product quality, information deficiency and inadequate management systems prevailing in several sub-sectors of the sector. Most of these enterprises compete only on the basis of low cost of labour and not through improvement of products, technologies and skills. With Indian economy on the path of liberalisation, the protective framework is giving way to greater degree of competition from the large sector within the country and imports from abroad. Thus the need to achieve competitiveness at global level has become a matter of primary concern.

It is clear that in future, the survival and growth of SSIs would largely depend on their ability to innovate, improve operational efficiencies and strike a balance between social concern, ecological functioning, quality of work and the environment. Such a balance would ensure sustainable development and can be a leading force to spur all round growth and development. It is evidently clear that solutions to these effects cannot be expected to follow from simply following models that have been used for large-sale industries. SSI operations in India are still very much rooted in a socio-economic culture that is very specific and unique for a cluster. Implementation of any growth oriented strategy, therefore, must support both welfare and environmental integrity, and has to be evolved based on the specific needs of a SSI cluster.

The above discussions suggest that there is an urgent need to explore comprehensive frameworks that could accelerate implementation of technological up-gradation and modernisation projects in the sector. In this context, CDM (clean development mechanism), introduced in the Kyoto Protocol to the FCCC (Framework Convention on Climate Change), has a great potential to facilitate such a change. CDM has been conceived as an international instrument to promote sustainable development in the developing countries along with cost-effective climate change mitigation. The idea is to facilitate co-operative projects between developed and developing countries for reduction of GHG (greenhouse Gas) emissions (primarily CO2), with the opportunity for additional financial and/or technological inputs from the developed countries towards cost-effective emission reduction from the developing countries.

Development of technological, institutional and human capacity to reduce energy consumption in the small-scale sector represents a much desired and viable option to achieve long-term sustainable growth of the sector. Clustering of most of the units operating under the sector makes it more convenient from the point of view of making an effective and efficient intervention. The specific purpose of CDM projects in the context of SSI sector, therefore, would be to decrease transaction costs to users, and thus increase the financial attractiveness of the energy-efficient and environmentally sounder technological projects for their wider adoption and replication across the sector.

This report reviews the Indian small-scale sector in terms of its specific features, structure, support institutions, governmental policies and programmes, and performance in the past few years. It further analyses a total of 41 small-scale industry sub-sectors in terms of total energy consumption. Based on various performance indices as well as sector needs, three specific small-scale sub-sectors have been identified for further study in order to explore the applicability of CDM projects in these sub-sectors.

1

Background information of small-scale sector in India

1.1 Classification and Definition of Indian Small Scale Sector

The small-scale sector in India comprises small-scale and ancillary industrial undertakings. The small-scale units are further categorised as Tiny Enterprises, EOUs (Export Oriented Units), SSSBEs (Small-Scale Service and Business Enterprises) and Women Enterprises. The small-scale sector is a part of the larger Village and Small Industries (VSI) sector, which consists of modern small-scale industries and traditional small industries located in rural as well as urban areas. Small-scale industries (both factory and non-factory sector) and powerloom units are covered under modern small-scale industries, while traditional industries include segments like handlooms, khadi and village industries, handicrafts, sericulture, silk, coir, etc. Modern SSIs are mostly units that use power-driven machinery and processes relatively better production techniques as compared to traditional units.

Currently, a small-scale unit is defined in terms of investment ceilings on the original value of installed plant and machinery. The present definitions of various categories of small-scale sector are as following:

Small-scale industry: SSI is defined as an industrial undertaking in which investment in plant and machinery, whether held on ownership terms or on lease/hire purchase basis, does not exceed Rs. 1.0 crore.

Ancillary unit: An ANC is defined as an industrial undertaking in which investment in plant and machinery does not exceed Rs. 10 Lakh.

Tiny industry: An industrial undertaking in which investment in plant and machinery does not exceed Rs. 25 Lakh is regarded as a tiny industry.

Export Oriented Units: An industrial undertaking in which investment in plant and machinery does not exceed Rs. 75 Lakh, is regarded as an export-oriented unit.

SSSBE: An industrial undertaking in which investment in plant and machinery does not exceed Rs. 5.0 Lakh is regarded as a SSSBE industry.

Women Enterprise: These are the enterprises owned and administered by a woman. The investment ceiling is kept up to Rs. 35 Lakh for small-scale industrial unit and up to Rs. 45 Lakh for an ANC.

It may be pertinent to mention here that in India there exists no specific definition of small and medium enterprises. What prevails is the concept of small scale (including ancillary) and tiny industries, which are classified in terms of historical value of investment in plant and machinery, whereas the world over, the phrase generally used is "Small and Medium Enterprises" (SMEs) and the criteria mostly includes the number of employees.

1.2 SSI Clusters

In India, most of the SSIs primarily emerged in natural clusters. A cluster may be defined as a local agglomeration of enterprises, which are producing and selling a range of related and complementary products and services. Although there may be more than reasons that have contributed to the coming up and growth of these clusters, the most impending reason seems to be market based.

It has been estimated that there exist about 350 SSI clusters in India. The size in terms of the number of units and the quantum of output of these clusters vary significantly. Some of them are so big that they produce up to 70-80% of the total volume of that particular product produced in the country. On the other hand, some clusters are very small, employing less than 100 workers in total.

The clusters in SSI sector have a significant role to play. The "clustering effect", to some extent, has addressed the problems related to the small size SSIs have and improved their competitive position. However, the big benefits in terms of shaping a shared local development vision and giving strength to collective actions to enhance entrepreneurial strategies are severely constrained to a large extent. The main reasons for this could be attributed to (a) the high transaction costs that need to be borne to identify suitable partners and to forge relationships; (b) the imperfect functioning of markets for such crucial inputs for network development as information and innovation; and, (c) the high risk of "free riders" faced specially in contexts where the legal framework to back up joint endeavours is relatively underdeveloped.

1.3 Organisational Support Structure

In order to give a focused attention to the development of small-scale and village industries, the ministry of Small Scale Industries and Agro & Rural Industries (SSI, A&RI) was created in 1999. The ministry monitors the growth and development of small-scale, khadi, village and coir industries in the country by formulating appropriate policies for their sustained growth. The ministry also initiates appropriate steps for setting up of a network of institutions at the field level to render assistance and to provide a comprehensive range of services to the SSI sector. These services cover consultancy in techno-economic and managerial aspects, training, testing facilities, marketing assistance, etc. These activities are carried out through attached offices/organisations of the government, viz., Development Commissioner (SSI), Khadi and Village Industries Commission (KVIC), National Small Industries Corporation (NSIC), Coir Board, etc. These agencies are supported by a host of other central/state government departments, promotional agencies, autonomous institutions, NGOs, etc. for providing support to SSIs in different ways.

1.3.1 Central Government Network

1.3.1.1 Small Scale Industries Board

The Small Scale Industries Board was constituted in 1954 to facilitate co-ordination and inter-institutional linkages and to render advice to the Government on various policy matters and other related issues concerning promotion and development of the small-scale sector. The term of the SSI Board is for two years.

1.3.1.2 Small Industries Development Organisation

The office of the Development Commissioner (SSI) also known as Small Industries Development Organisation (SIDO) is an attached office of the Ministry of SSI, A&RI. SIDO, set up in 1954, functions through a network of 28 Small Industries Services Institutes (SISIs), 30 Branch SISIs, 4 Regional Testing Centres, 8 Field Testing Stations, 10 Tool Rooms, 2 Central Footwear Training Institutes, one Production Centres, 6 Product-cum Process Development Centres, and 3 Training Institutes.

The major activities of SIDO include (i) evolving an all India policy and programme for the development of SSIs (ii) coordinating the policies and programmes of various State Governments (iii) maintaining liaison with different State and Central Ministries, Planning Commission, Reserve Bank of India and Financial Institutions and dissemination of economic information (iv) providing a comprehensive range of extension services through allied institutions (v) providing facilities for technology up-gradation, modernisation, quality improvement, etc. (vi) offering services such as consultancy in technical and managerial aspects, training, common facility centres, testing and tool room facilities and marketing assistance for SSI.

1.3.1.3 Small Industry Service Institute

Twenty eight Small Industries Service Institutes (SISIs) and 30 Branch SISIs are operational through out the country and their respective performance is overseen by the office of the DC (SSI). The main functions performed by SISIs are interface between Central and State Governments, dissemination of economic information, technical support services and consultancy services, entrepreneurship development programmes, etc. SISIs prepare reports covering, among others, implementation of programmes on modernisation, energy conservation, quality control / up-gradation and pollution control for the benefits of entrepreneurs.

1.3.1.4 Product-cum-Process Development Centres (PPDCs)

The main functions of PPDCs include serving as research and development institutions in areas of industry clusters, looking into specific problems of industry product design and innovation, developing new processes and upgrading the existing level of technology, acting as centres of excellence in the concerned field and rendering technical support services, etc. Six PPDCs have so far been established at different locations of the country and are providing services to SSIs.

1.3.1.5 Regional Testing Centres

Four Regional Testing Centres (RTCs) at Chennai, New Delhi, Mumbai and Calcutta have been established for spreading quality awareness amongst industrial units through systematic testing and by rendering technical consultancy services. These centres are equipped with modern sophisticated machinery and equipment for testing mechanical, electrical, chemical and meteorological products. They are accredited to the Bureau of Indian Standards

(BIS), Pollution Control Board (PCBs), etc. RTCs also support 7 Field Testing Stations that provide testing services to SSI units in different product lines.

1.3.1.6 Training Institutes

National Institute of Small Industries Extension & Training (NISIET), Hyderabad, National Institute for Entrepreneurship and Small Business Development (NIESBUD), New Delhi, and Integrated Training Centre (Industries), Nilokheri, are the main training institutes which function under the administrative control of SIDO and organise a variety of training courser for entrepreneurial development

1.3.1.7 National Small Industries Corporation

The National Small Industries Corporation Limited (NSIC) is a public sector undertaking set up by the Government of India in February 1955 to promote, aid and foster the growth of small-scale industries in the country. The Corporation provides support to small scale industries in the form of (i) supplying indigenous and imported machines on easy hire-purchase and lease term basis; (ii) enlisting competent units and facilitating their participation in Government Stores Purchase Programme and providing diversified marketing support through Marketing Assistance Scheme; (iii) assisting in export of small industries products and developing export worthiness of small scale units; (iv) developing prototypes of machines, equipment and tools which are subsequently passed on to small scale units for commercial production; (v) providing training in industrial trades; (vi) extending assistance to SSIs through financial centres operating at New Delhi, Mumbai, Ahmedabad and Goa for marketing, bills discounting, raw materials purchases and exports; (vii) assisting SSIs in technology acquisition, adapt ion and upgradation through its Technology Transfer Centre at New Delhi.

1.3.1.8 Khadi and Village Industries Commission

The Khadi and Village Industries Commission (KVIC) is a statutory organisation established in 1957 under an Act of the Parliament. KVIC assists in promotion and development of khadi and village industries. The main objectives of KVIC include rural industrialisation, promotion of self-reliance among the people and to build up strong rural community base, skill development, creation of employment opportunities in rural areas and transfer of technology. For development of khadi and village industries, KVIC plans, promotes, organises and implements programmes and provides financial assistance to the eligible agencies. The corporation arranges training for persons employed in the sector or desirous of seeking employment in khadi and village industries, besides supervisors and other functionaries. KVIC also holds stocks of raw materials and supplies them at such rates as may be decided from time to time. It undertakes R&D activities in khadi and village industries sector and encourages promotion of cooperative efforts among persons engaged in khadi and village industries.

1.3.1.9 Coir Board

The Coir Board is an autonomous body established by the Government of India under Coir Industry Act, 1953 for overall development of the coir industry. The activities pursued by the Board include undertaking scientific, technological and economic research and development activities, collection of statistics relating to exports and domestic consumption of coir and coir products, development of new products and designs, policy formulation to promote exports and domestic sales, marketing of coir and coir products in India and abroad, preventing unfair competition among producers and exporters, carrying out training for grooming skills, assisting in setting up of factories for manufacture of products, promoting cooperative organisations among producers of husk, coir fibre, coir yarn and manufacturers of coir products and ensuring remunerative returns to producers and manufacturers.

1.3.2 State Government Agencies

The State Governments have their own policies for promotion and development of small scale, cottage, medium and large-scale industries. In each State, the Commissioner / director of Industries implements the State government policies and directives for promoting industrial development. The Central policies for SSI sector serve as guidelines for framing State level policies and packages of incentives. The Commissioner / Director of Industries also oversees the activities of the field offices, viz. District Industries Centres (DICs), at the district level which are mostly engaged in extension activities, besides administrative and regulatory work.

1.3.2.1 District Industries Centres

The District Industries Centres (DICs) Programme was initiated in May 1978, as a centrally – sponsored scheme, with the objective of developing small, tiny and cottage industries in the country and to generate more employment opportunities especially among rural and backward areas. The establishment of offices of DICs at district level aimed at providing support facilities /

concessions / services in dispersed rural areas and other small towns. There were 430 centrally approved DICs, which covered almost all parts of the country except the metropolitan cities at the time of the withdrawal of the Central sponsorship in 1993-94. At present, DICs are being operated under respective State budgetary provisions. The extension services provided by DIC include (i) dissemination of information, (ii) supply of machinery and equipment, (iii) provision of raw materials and quality inputs, (iv) arrangements for credit facilities, (v) marketing, and (vi) consultancy.

1.3.2.2 State Financial Corporations

State Financial Corporations (SFCs) came into being under the provision of the SFCs Act, 1951. At present, there are 18 SFCs, of which 17 were set up under SFCs Act and one under the Companies Act. The main objectives of SFCs are to finance and promote small and medium enterprises in their respective States for achieving balanced regional growth, catalyse investment, generate employment and widen the ownership base of industry. Financial assistance to small and medium enterprises is provided by way of term loans, direct subscription to equity / debentures, guarantees, discounting of bills of exchange and seed capital assistance. They also provide financial assistance for small road transport operators, hotels, tourism-related activities, hospitals, nursing homes, etc.

1.3.2.3 State Industrial Development Corporations/State Industrial Investment Corporations

State Industrial Development Corporations / State Industrial Investment Corporations (SIDCs / SIICs) were set up under the Companies Act, 1956 as wholly-owned undertakings of the State Governments to act as catalysts for industrial development in their respective States. At present, there are 28 SIDCs in the country, of which eleven also function as SFCs and are, therefore, termed as Twin-Function IDCs. SIDCs develop land and provide industrial infrastructure facilities in the form of factory sheds and / or developed plots together with facilities like roads, power, water supply, drainage and other amenities. Set up primarily for providing assistance to medium and large-scale industries, SIDCs / SIICs also extend assistance to the small-scale sector by way of term loans, subscription to equity and promotional services.

1.3.2.4 State Small Industrial Development Corporations

State Small Industries Development Corporations (SSIDCs) were established under the Companies Act 1956 as State Government undertakings to cater to the needs of the small, tiny and village industries in the respective States / Union Territories. Being operationally flexible, SSIDCs undertake a variety of activities for benefit of the SSI sector, the important ones are: Procurement and distribution of scarce raw materials; supply of machinery to SSI units on hire-purchase basis; providing assistance for marketing of products; construction of industrial estates, provision of allied infrastructure facilities and their maintenance; extending seed capital assistance on behalf of State Government; providing management assistance to production unit.

1.3.2.5 Other Agencies

Other State-level agencies that extend facilities for promotion of SSIs are State Infrastructure Development Corporations, State Co-operative Banks, Regional Rural Banks, State Export Corporations, State Agro Industries Corporations and State handloom & Handicrafts Corporations.

1.3.3 Financial Institutions

The Government of India and Reserve Bank of India (RBI) have been instrumental in devising a multi agency approach / system to ensure credit dispensation to different sectors of the economy, including SSI. The distinctive feature of multi agency set up is that each of the major institutions cater to the needs of a particular segment of the economy, e.g., agriculture, industry, export, housing, etc. Prior to setting up of Industrial Development Bank of India (IDBI) and Small Industries Development Bank of India (SIDBI), banks availed of refinance from RBI against their eligible loans to SSIs. IDBI and SIDBI have been the main providers of refinance to State Level Institutions such as SFCs and SIDCs.

For the purpose of credit dispensation to the SSI sector, the following major national and state level institutions are operating in the country:

Apex Level Financial Institutions:
    Small Industries Development Bank of India

Banks:
    Commercial Banks
    Regional Rural Banks
    Co-operative Banks

State Level Institutions:
State Financial Corporations
State Industrial Development Corporations
State Industrial Investment Corporations
State Small Industries Development Corporations

Other Financial Institutions & Agencies:
National Bank for Agriculture and Rural Development
Khadi and Village Industries Commission
National Small Industries Corporation
North Eastern Development Finance Corporation Ltd

Small Industries Development Bank of India (SIDBI) was set up in April 1990, as the principal financial institution for promotion, financing and development of industries in the small-scale sector and to coordinate the functions of the institutions engaged in similar activities. SIDBI initially set up as a wholly owned subsidiary of IDBI, has since been de-linked from IDBI and is presently working as an independent autonomous body for financing of Small Scale Industries Sector. SIDBI's major operations cover three main areas: (i) Indirect Assistance, (ii) Direct Assistance, and (iii) Development and Support Services.

4 *Industry Associations*

In addition to the Central and State Government agencies, industry associations also provide institutional support to the small-scale sector. Industry associations provide SSIs with a common platform to raise industry-related issues and to initiate co-operative efforts for promoting SSIs. Government's policies, in recent years, have stressed the increasing role of industry associations in setting up common facilities and other co-operative ventures in areas of technology, marketing and other support services. Some of the major industry associations providing services are:

- Federation of Tiny & Small Industries of India
- Indian Council of Small Industries
- Laghu Udyog Bharti
- Federation of Indian Export Organisations
- World Association for Small & Medium Enterprises
- Federation of Associations of Small Industries of India
- Consortium of Women Enterprises of India
- Manufacturers' Association for Information Technology

- Electronic Component Industries Association
- Federation of Indian Micro and Small & Medium Enterprises
- National Association of Software & Services Companies
- Hand Tool Manufacturers' Association
- Self -Employed Women's Association
- All-India Women's Association of Karnataka
- Tamil Nadu Small Industries Association
- Small Industries Association of Orissa
- Small Industries Association of Gujarat
- Confederation of Indian Industry*
- Federation of Indian Chambers of Commerce and Industry*
- PHD Chamber of Commerce and Industry*
- Associated Chambers of Commerce & Industry of India*

(*These organisations are catering to large scale industries and also have special cells for SSI units)

1.3.5 Non-Government Organisations

Non-Government Organisations (NGOs) are an important link in the implementation of various developmental programmes of the Government. There is a team effort in the working of the NGOs and these organisations develop and apply new techniques and ways of working to achieve success. NGOs are registered under the Society's Registration Act and / or under Foreign Contribution Regulation act and are generally non-profit organisations.

1.3.6 Specialised Institutes for Human Resource Development

There are a number of specialised institutes associated with SIDO for training, research, and development of product design and processes.

1.3.7 Export Promotion Councils

In order to overcome the problems in marketing of SSI products in foreign markets, it has been considered desirable to adopt a consortium approach. The export promotion council for different industries make efforts to promote exports of their member units through direct marketing, developing vendor relations, opening respective sales outlets abroad as a collective export marketing strategy. The activities of different Councils are targeted to increase exports from the sector. The Export Promotion Councils (EPCs) are registered as non-profit organisations under the Companies Act /Societies Registration Act.

SSI units get access to export–related services from the Councils. Some of the Councils obtain bulk purchase orders from foreign buyers and distribute them among member units for supply to the Council for onward export. The EPCs also offer a package of other services to members and others by way of information dissemination, Export – Import policies and procedures, customs and excise duty rules etc. Besides, trade inquiries, tender notices are circulated among members in order to assist them to avail of business opportunities for augmenting overall exports.

1.3.8 *Institutions to Assist Exporters*

The following important agencies are available for assistance of exporters in their endeavour to increase exports from the country:

- Indian Institute of Foreign Trade
- Indian Institute of Packaging
- Export Houses, Trading Houses & Star Houses and Super Star Trading Houses
- Export Credit Guarantee Corporation of India Ltd
- Export Inspection Council

1.3.9 *Industry-related Research Institutes*

There are a number of industry- related research institutes, which undertake research in various aspects connected with growth of industry, including SSI sector. Important industry- related research institutes include:

- Central Manufacturing Technology Institute
- Central Pulp & Paper Research Institute
- National Council for Cement & Building Materials
- Automotive Research Association of India
- Indian Rubber Manufacturers Research Association
- National Institute of Design
- Quality Council of India
- Central Leather Research Institute
- Council of Scientific & Industrial Research

1.4 Industry status

1.4.1 *Number of units and their distribution*

As per the Small Industry Development Organisation (SIDO) estimates, which takes into account the residual units that are not covered by any assistance programme of the sector-specific statuary bodies, the total number of organised sector units in the country were 32.3 Lakh in the year 2000. A graph showing the number of SSI units from 1974 on cumulative basis is enclosed in figure 1.4.1.

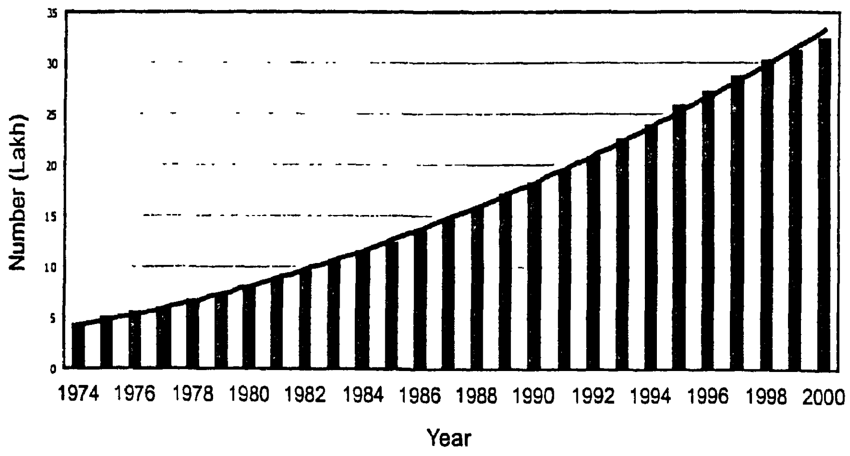

Figure 1.4.1 No. of SSI units

It could be observed from the figure that over the 25 year period of analysis, number of units kept on increasing on a constantly, registering an annual compound growth rate of 8.5%.

As per the Manufacturing Enterprises Survey (MES) conducted by CSO (Central Statistical Organisation) in 1994-95, more than 72 per cent of the unorganised SSI enterprises were located in rural areas and the balance in urban areas. The survey also reveals that majority of the units were owned by individual proprietors and a nominal number was in partnership firms' category.

A comparative position of the industry group-wise distribution of SSIs as per the survey conducted by the office of DC (SSI) and MES is given in Table 1.4.1.

Table 1.4.1 Industry Group Wise Distribution of SSI units

NIC code	Industry group	DC (SSI) Census 1988-92		MES 1994-95	
		Units ('000)	% of total	Units ('000)	% of total
20-21	Food Products	200.75	17.46	2394.32	16.50
22	Beverages, Tabacco & Tabacco Products	6.38	0.56	1426.56	9.84
23	Cotton Textiles	3.96	0.34	818.51	5.64
24	Wool, Silk & Synthetic, Fibre	2.66	0.23	340.19	2.35
25	Jute, Hemp, and Mesta Textiles	0.53	0.05	95.00	0.65

NIC code	Industry group	DC (SSI) Census 1988-92 Units ('000)	% of total	MES 1994-95 Units ('000)	% of total
26	Hosiery and Garments, etc.	91.55	7.96	1093.60	7.54
27	Wood Products	107.03	9.31	2872.71	19.81
28	Paper products and printing	53.77	4.68	174.93	1.21
29	Leather and leather products	44.02	3.83	211.31	1.46
30	Rubber and plastic products	46.40	4.04	143.32	0.99
31	Chemical and chemical products	49.69	4.32	84.64	0.58
32	Non-Metallic Mineral Products	59.88	5.21	853.15	5.88
33	Basic Metal Industries	28.58	2.49	34.12	0.24
34	Metal Product	131.75	11.46	449.66	3.10
35	Machinery & Parts Except Electrical	76.50	6.66	95.03	0.66
36	Electrical Machinery & Parts	26.63	2.32	28.89	0.20
37	Transport Equipment & Parts	20.97	1.82	28.23	0.19
38	Miscellaneous Mfg. Industries	19.56	1.70	1159.41	7.99
39	Other Repair Services	177.87	15.47	2186.85	15.08
40	Services (not elsewhere classified)	1.05	0.09	13.68	0.09
	Total	1149.53	100.00	14504.11	100.00

NA: Not Available

Source: DC (SSI) – small-scale industries census, CSO – enterprise survey 1994-95 and UNIDO report 1997

Following two important features could be observed from the table 1:

- Based on DC (SSI) survey, food products (17%) and metal products (11.5%) had a predominant share in the industry group wise distribution of SSI units.
- Based on MES, almost one-fifth of the small-scale units (19.8%) in the unorganised sector were engaged in manufacture of wood products, followed by food products (16.5%).

1.4.2 *Performance of SSI sector*

The village and small scale industries (VSI) sector, including traditional / rural industries, is an important segment of the Indian economy accounting for around 95 per cent of the industrial units, 49 per cent of the output of the manufacturing sector and around 50 per cent of the country's total exports. Out of the above, the modern SSIs account for 40 per cent of the output of the manufacturing sector and 35 per cent of the country's total exports. The sector, covering a wide spectrum of industries categorised under small, tiny and ancillary units, provides direct employment to around 180 lakh persons. The SSI sector encompasses continuum of the artisans / handicrafts on the one hand and modern production units on the other, producing more than 7,500 products. The products manufactured by the sector range from traditional handicrafts to high precision instruments for "sun-rise" industries.

From the point of view of nurturance of the entrepreneurial talent, the sector serves as a nursery, enabling the small-scale units to graduate into medium-scale. The small-scale sector has received substantial attention from the policy makers in appraising its requirements, be it fiscal, financial, marketing, technology, entrepreneurship development or infrastructure. Over the period of time, the control measures have been relaxed to enable the sector to march ahead on a high growth path.

1.4.2.1 Production

The share of manufacturing sector in the overall National Domestic Product of the country in the last five decades has been on increase. An analysis of the net domestic product estimates, according to economic activities, shows that the share of manufacturing sector in Net Domestic Product of the country for the period 1980-81 to 1996-97, at constant 1980-81 prices, has increased from 17.7 per cent to 22.5 per cent. The share of unregistered manufacturing sector, at constant prices, has remained more or less stable in the total economic activity.

To analyse the contribution of SSI sector in the overall industrial growth, it is important to link and understand the growth pattern of both the sectors. Table 1.4.2.1a shows a comparative position of the real growth of the overall industry sector and SSI sector. It could be seen from the table that the SSI sector has shown a better performance in relation to the overall industry sector and increase in the manufacturing sector output, barring once in the last ten years. The higher rate of growth of the SSI sector has helped in pushing the growth rate of manufacturing as well as overall industry sector.

Table 1.4.2.1a Comparative real growth of overall industrial sector & SSI sector

Year	Overall Industry	Manufacturing sector	SSI sector
1990-91	8.2	9.0	9.1
1991-92	0.6	-0.8	3.1
1992-93	2.3	2.2	5.6
1993-94	6.0	6.1	7.1
1994-95	8.4	8.5	10.1
1995-96	12.8	13.8	11.4
1996-97	5.6	6.7	11.3
1997-98	6.6	6.7	8.4
1998-99	4.0	4.4	7.7
1999-2000	6.4	7.0	8.1

Source: Economic Survey 1998-99, Ministry of Finance, GOI

Labour and capital productivity are partial measures of efficiency. Labour productivity is measured as the net value added per employee. Similarly, capital productivity is measured as the net value added per unit of capital invested. The relative labour productivity of the SSI sector has been calculated by dividing the labour productivity of the SSI sector by the labour productivity of the large-scale sector. Relative capital productivity of the SSI sector has also been calculated in a similar manner. The Table 1.4.2.1b indicates labour and capital productivities and relative productivities of capital and labour for SSI sector as compared to the large-scale sector.

Table 1.4.2.1b Labour and capital productivity, SSI, large and total factory sector

	Labour productivity*			Relative labour productivity	Capital productivity**			Relative capital productivity
Year	Small	Large	Total	(small/large)	Small	Large	Total	(small/large)
1980-81	7814	20067	15462	0.39	0.48	0.23	0.25	2.09
1981-82	7696	23090	17168	0.33	0.49	0.25	0.28	1.96
1982-83	7917	24548	18231	0.32	0.52	0.26	0.28	2.00
1983-84	10384	27120	21075	0.38	0.59	0.28	0.31	2.11
1984-85	10099	25761	20488	0.39	0.59	0.27	0.3	2.19
1985-86	11118	29758	22267	0.37	0.59	0.28	0.31	2.11
1986-87	11189	31555	23723	0.35	0.59	0.28	0.31	2.11
1987-88	11106	31294	23618	0.35	0.56	0.26	0.29	2.15
1988-89	12282	35382	26489	0.35	0.55	0.28	0.31	1.96
1989-90	13014	38694	29003	0.34	0.67	0.3	0.33	2.23
1990-91	12721	41532	31420	0.31	0.62	0.3	0.32	2.07
1991-92	14958	39517	29721	0.38	0.65	0.27	0.31	2.41
1992-93	13016	46188	33116	0.28	0.61	0.29	0.31	2.10
1993-94	17065	52539	38845	0.32	0.69	0.3	0.33	2.30
1994-95	15882	55819	40942	0.28	0.65	0.3	0.33	2.17
1995-96	15334	59048	43899	0.26	0.54	0.31	0.33	1.74
1996-97	16390	59610	44341	0.27	0.59	0.29	0.31	2.03

* Value added in Rupees per employee

** Net Value added per unit of capital invested

Source: Annual Survey of Industries, CSO (various issues)

From the above Table, it could be observed that the relative labour productivity of SSI sector, which is less than one, indicates that the labour productivity of SSI sector is lower than that of the large scale sector, i.e., the SSI sector operations are more labour intensive. The SSI sector employs as much as 5 times more workforce than the large-scale sector for the same output (1996-97). On the other hand, the relative capital productivity of SSI sector, which is more than one, shows that the capital productivity of SSI sector is higher than the capital productivity of the large scale sector and total factory sector, i.e. the large scale sector is more capital intensive. The capital input in large-scale sector is 2 times more than the SSI sector (1996-97). In a capital scarce and labour surplus economy like that of India, obviously SSI sector would be preferable to large-scale sector, wherever the overall cost difference is not substantial.

Figure 1.4.2.1 presents the profile of value of production of SSI sector at current prices for a period of 1974 to 2000.

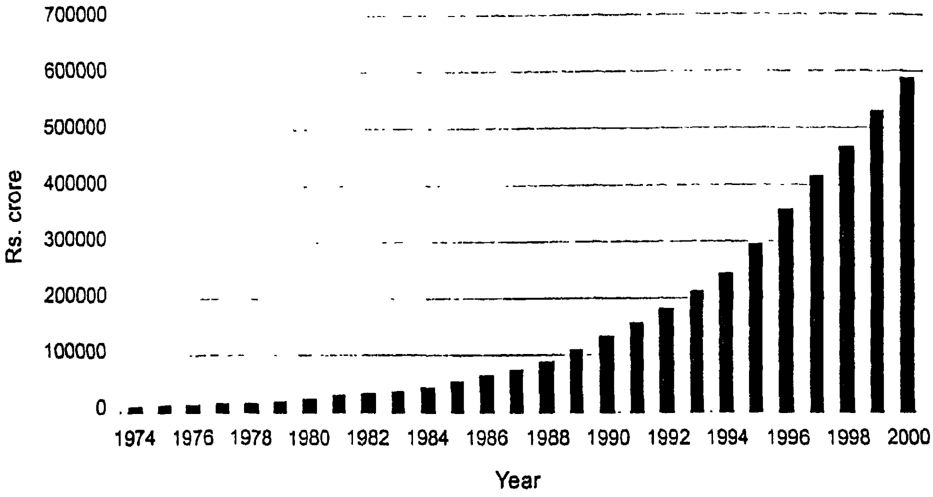

Figure 1.4.2.1 Production of SSI sector

The analysis of the figure 1.4.2.1 reveals that the product of the SSI sector registered an increase from a level of Rs. 7200 crore in 1974 to Rs. 5,27,515 crore in 1999 and over Rs. 5,87,000 crore in the year 2000. When deflated at 1993-94 prices, this increase was more than ten-fold during the said period.

1.4.2.2 Employment

Small-scale industries sector in India is the second largest manpower employer in the country, next only to agriculture. High employment generating potential of small enterprises is one of the most important aspects of the sector. This feature gains added importance in a labour surplus economy like India. The number of persons employed in the sector is estimated to increased from 16.52 lakh in 1972 to 178.5 lakh in 2000, showing more than four fold rise in the level of employment. Details of year-wise employment are given in Table 1.4.2.2.

Tale 1.4.2.2 Employment in SSI sector

Year	Cumulative no. (lakh)	Employment (lakh persons)	Employment/unit
1972	1.38	16.52	12.00
1974	4.2	39.7	9.45
1975	5	40.4	8.08
1976	5.5	45.9	8.35
1977	5.9	49.8	8.44
1978	6.7	54	8.06
1979	7.3	63.8	8.74

Year	Cumulative no. (lakh)	Employment (lakh persons)	Employment/unit
1980	8.1	67	8.27
1981	8.7	71	8.16
1982	9.6	75	7.81
1983	10.6	79	7.45
1984	11.6	84.2	7.26
1985	12.4	90	7.26
1986	13.5	96	7.11
1987	14.6	101.4	6.95
1988	15.8	107	6.77
1989	17.1	113	6.61
1990	18.2	119.6	6.57
1991	19.5	125.3	6.43
1992	20.8	129.8	6.24
1993	22.5	134.1	5.96
1994	23.9	139.4	5.83
1995	25.7	146.6	5.70
1996	27.2	152.6	5.61
1997	28.6	160	5.59
1998	30.1	167.2	5.55
1999	31.2	171.6	5.50
2000	32.3	178.5	5.53

Source: DC (SSI), Ministry of SSI, A&RI

It may also be observed from the table that the average employment per unit, however, has come down from 12 to 5.53 during the same period. It is estimated that the maximum employment is generated in the sectors of Food Products (13.1%) followed by Non-metallic mineral products (12.2%) and metal products (10.2%). Although it is difficult to estimate the quantum of actual employment generated by clusters in view of limited data availability, yet it does help to provide an indicator to the fact that clusters of SSIs are highly employment intensive.

1.4.2.3 Exports

The most significant achievement of the SSI sector has been its performance in the field of exports. The share of SSI exports in overall exports of the country increased rapidly from 15.6 per cent in 1974 to 34.9 per cent in 1999 and about 13 per cent in the year 2000 in dollar terms. Details of exports from the SSI sector for the period 1973-74 to 1999-00 are furnished in Table 1.4.2.3.

Table 1.4.2.3 Exports from SSI sector

Year	Export at current prices (crore Rs)	SSI export as % of production value	SSI export as % of total export
1974	393	5.5	15.6
1975	541	5.9	16.2
1976	532	4.8	13.2
1977	766	6.2	14.9
1978	845	5.9	15.6

Year	Export at current prices (crore Rs)	SSI export as % of production value	SSI export as % of total export
1979	1069	6.8	18.7
1980	1226	5.7	19.1
1981	1643	5.9	24.5
1982	2071	6.4	26.5
1983	2045	5.8	23.2
1984	2160	5.2	22.2
1985	2541	5.0	21.6
1986	2769	4.5	25.4
1987	3643	5.0	29.3
1988	4372	5.0	27.9
1989	5489	5.2	27.1
1990	7625	5.8	27.6
1991	9664	6.2	29.7
1992	13883	7.8	31.5
1993	17785	8.5	33.1
1994	25307	10.5	36.3
1995	29068	9.9	35.2
1996	36470	10.2	34.3
1997	39248	9.5	33
1998	44442	9.6	34.2
1999	48979	9.3	35
2000	53975	9.2	33

Source: DC (SSI), Ministry of SSI, A&RI

1.4.2.4 Sickness in the SSI sector

The issue of non- performing assets (NPA) has engaged continual attention of the banks, FIs (financial institutions) and all others concerned. The amount locked up in the sick SSI units has gradually gone up from around Rs. 2792 crore in 1991 to over Rs. 4313 crore in 1999. Status of sickness in SSI units in terms of the number of units and amount outstanding for the period 1991-98 is presented below in Tables 1.4.2.4.

Table 1.4.2.4 SSI sickness

	No. of units			Outstanding amount (Rs crore)		
Year	SSI	Total	% SSI	SSI	Total	% SSI
1991	221472	223809	98.96	2792	10768	25.93
1992	245575	247924	99.05	3101	11533	26.89
1993	238176	240700	98.95	3443	13134	26.21
1994	256452	258952	99.03	3680	13696	26.87
1995	268815	271206	99.12	3547	13739	25.82
1996	262376	264750	99.10	3722	13748	27.07
1997	235032	237400	99.00	3609	13787	26.18
1998	221536	224012	98.89	3857	15682	24.60
1999	306221	309013	99.10	4313	19464	22.16

Source: RBI report on Trends and Progress of banking in India

A number of initiatives like setting up of Debt Recovery Tribunals and One Time Settlement Norms have been taken to curb the growth of NPAs. To have better sharing of credit related information on borrowers, RBI is examining the possibility of setting up of a Credit Information Bureau. For tackling the problems of industrial sickness in the SSI sector and for rehabilitation of sick units, the RBI has been issuing various guidelines from time to time.

1.5 Existing Central and State Government Policies

The primary responsibility to develop village and small industries rests with the State Governments concerned. However, the Central Government announces from time to time various incentive schemes/concessions and support services for promotion and development of industries, particularly in industrially backward areas and other special regions. These incentives are provided to promote growth, employment and exports and reduce regional imbalances. Some of the incentives extended to the SSIs are on "one-time" basis and are offered in the form of support for a specific period (protectionist measures, subsidies, etc.). While some incentives are made available to all type of industrial units, including the large ones, others are earmarked exclusively for the small-scale industries. Subsequent to the Industrial Policy of 1991, the SSI sector has been provided with a number of fiscal, financial and other incentives, which are described below:

1.5.1 Fiscal incentives

Fiscal incentives provided to small scale enterprises are in the nature of tax concessions granted in the form of exemptions, rebates, refund or postponement of direct or indirect taxes leviable on production or profit, besides special tax concessions. Following are the major fiscal incentives available to the SSIs:

1.5.1.1 Tax Incentives / Concessions / Deduction from profits and gains

- Twenty per cent (Income Tax Section 80HH) for 10 years for industries to be set up under Factories Act in backward areas.
- 20 percent (IT Section 80HHA) for 10 years for SSI units to be set up in rural areas.
- 20 percent (IT Section 80I) for 7 to 9 years for industries to be set up under Factories Act, 25 percent for 11 years in case of Co-operative Societies, 35 percent for Companies.
- 25 percent (IT Section 80IA) for 10 years for industries to be set up under Factories Act, 100 percent for 5 years & 25 percent for next 5 years for backward areas only.

1.5.1.2 Incentives for Exports including duty drawbacks:

In addition to the incentives offered through the foreign trade policies and the Foreign Exchange Management Act (FEMA), the Government offers various tax incentives in the form of deduction in respect of profits and gains from projects outside India (Section 80 HHV), Export Turnover (Section 80 HHC), earnings in convertible foreign exchange (80 HHD), Computer software (Section 80 HHE), Consultancy Exports (Section 80-O), initial tax holiday for newly established industrial undertakings in the Free Trade Zones (FTZs), or Electronics Hardware Technology parks (EHTPs) and Software Technology Parks (STPS) (Section 10 A), for newly established 100 percent Export Orient Undertakings (EOUs) (Section 10B). Duty drawback facilities are provided in two forms: (a) drawback of the whole of import duty or imported articles, components and raw materials and excise duty paid on excisable components used in manufacture of the product when it is exported and (b) drawback of 90 percent of duty paid on imported article when it is re-exported

1.5.1.3 Exemption and preferential treatment from Excise duties:

The general Excise Exemption was codified and rationalised in 1978, vide Notification No. 71/78-CE, dated 1/3/1978 which covered 69 items, providing fully duty exemption upto Rs. 5 lakhs turnover. The exemption limit and number of items covered under this scheme have been revised / expanded from time to time. For SSIs having clearances in the preceding financial year not exceeding Rs. 3 crore excise exemption upto annual turnover of Rs. 30 lakh were available upto 1998-99. In 1998-99 Budget, it was enhanced to Rs. 50 lakh. Excise concessions are not available upto annual turnover of Rs. 100 lakh. MODVAT Credit is allowed at the rate of 100 per cent of duty paid on inputs, be it excise duty or special duty or additional duty of customs. It also covers capital goods purchased and used by the manufacturers.

1.5.1.4 Exemption from Sales Tax

- No liability under State Sales Tax Law for import of the goods into or export of goods out of the territory of India
- Export sales have been exempted from the levy of sales tax under Central Sales Tax Act, 1956.

1.5.1.5 Other Incentives

Capital Investment Subsidy: Fifteen per cent of the project cost with a ceiling of Rs. 7,500 per beneficiary under Prime Minister's Rozgar Yojana. This limit for North Eastern Region (NER) States is Rs. 15,000
Transport Subsidy: Ranges from 75 per cent to 90 per cent in Himachal Pradesh, 8 hill district of Uttar Pradesh, Darjeeling district in West Bengal, Sikkim, J&K, Lakshadweep and A&N Islands permissible only till 31-3-2002. For NER States, the facility has been extended up to 31-3-2007.

1.5.2 Financial Incentives

For the purpose of granting credit, the banks / financial institutions accord priority status to the small-scale industries sector. Financial requirements of the SSIs are basically of two types, viz. Long-term loans and working capital. Total additional long-term credit requirement for the sector as a whole is estimated at Rs. 34,500–36, 500 crore and working capital funds at a level of Rs. 1,42,000–1,46,000 crore, at 1997-98 prices. While the requirement of term loans for the sector is, by and large, being met by the financial institutions, the need for adequate working capital remains to be fulfilled. The dynamics of the development process has, over the period, led to some changes in the role and perception of banks and financial institutions. With the onset of financial sector reforms, while the quantum of confessional funds for the sector has decreased, the availability of market related funds have expanded. Some of the major schemes with incentives of financial nature for the development of SSIs are briefly given below.

1.5.2.1 Reservation of Items for exclusive manufacture in the SSI sector

The policy of reservation of items for exclusive manufacture by SSIs was formulated in order to ensure development of SSI sector and to expand employment opportunities through setting up of SSI units. Reservation as a policy instrument is primarily intended to protect the interest of SSIs keeping in view their vulnerability when viewed against the competition from large units and foreign companies. This policy has been made applicable to the product lines that are techno-economically suitable for manufacture by SSIs.

The policy of product reservations has continued over the years and has been review form time to time by including additional items and excluding certain items already reserved. As of Feburary 1999, the total number of reserved items are 812.

With a view to expanding exports of those items which fall in the reserve category, a policy change was announced in December, 1997, according to which, non-SSI units manufacturing reserved items have been allowed to manufacture items under the reserved category, with an export obligation of a minimum of 50 per cent of the new or additional production (to be achieved within a maximum period of 3 years). Those SSI growing in size by crossing the investment ceiling prescribed for SSI have to obtain a licence from the Secretariat of Industrial Approval.

1.5.2.2 Price and Purchase Preference Scheme for SSI products

In order to provide marketing support to SSIs, a policy of granting preference in Government purchases for SSI products, both in terms of quantity and price, was initiated by the Government in 1956. The National Small Industries Corporation (NSIC) has been designated as the nodal agency to promote marketi9ng of SSI products to the Government under the preferential Purchase Policy. Under the Government Stores Purchase Programme, the Director General of Supplies and Disposals (DGS&D) is responsible for arranging purchases and delivery to the Government of India and attached offices. The Government has duly emphasised an increase in the quantum of purchases of various items from SSIs.

NSIC enlists SSIs under a single point registration programme with a view to avoiding multiplicity in the registration of SSIs with various Government agencies. The units so registered, are treated at part with those registered with the DGS&D and do not require any separate registration with any other Central GOovernment department or public enterprise. Special concession are provided to SSI units to participate in the Governments Stores Purchase Programme and include free supply of tender forms, exemption from registration fees and security deposit, etc.

Protection from competition is available to SSIs in the form of purchases of different products by the DGS&D. Store Purchase Policy of the Government prior to 1989 categorised various items in six major groups as detailed below:

Group I	Items, which are of no interest to SSI units and could be solely procured only from large scale units (128 items)
Group II	Items, which could be purchased solely from large-scale units but where it is possible for the large scale units to award job contract accessories and components to SSI units (159 items).
Group III	Items, which could be purchased both from small scale and large-scale industrial units.
Group IV	Items, which were reserved for exclusive purchase from SSI units (409 items)
Group V	Items, which were to be purchased from SSI to the extent of 75 per cent of the requirement (13 items).
Group VI	Items that were to be procured exclusively from the SSI units to the extent of 50 per cent of the requirement (28 items).

However, with effect from 28th July, 1989, the Purchase Policy of the Government changed in a major way and the categorisation of items was reduced to the following two major groups.

- Items of stores reserved for exclusive purchase from KVIC / Women's Development Corporations / Small Scale units; and
- Others not so reserved.

The first group comprised of 409 items earlier reserve for exclusive purchase from the small-scale sector. The list of 409 items reserved for purchase from the SSI sector has since been reviewed and at present there are 358 items (including 8 handicraft items) reserved for preferential purchase. The remaining items (not falling under the Reserved list) are provided a price preference upto 15 per cent over quotations from units in the large-scale sector.

1.5.2.3 Marketing Support

The SSI sector generally experiences lack of resources for sales promotion and advertising. Marketing of SSI products is an important form of assistance to the sector. The marketing infrastructure, as available for SSIs, consists of a combination of agencies and incentive schemes such as:

National Small Industries Corporation: The NSIC registers SSI and tiny units under a single point registration scheme and secures orders for supply of various stores tendered by the DGS&D on preferential terms.

Sub-Contracting Exchanges: The scheme of Sub Contacting Exchanges was started in 1974-75. Presently, there are 29 such Exchanges operating through the Small Industries Services Institutes (SISIs). These Exchanges enlist SSIs and identify items for ancillarisation from various Public Sector Undertakings. These Offices promote contacts between large and medium scale industries on the one hand and SSI ancillary units on the other to secure sub-contracting jobs.

Quality Certification: SSI units are provided quality certification facilities through Bureau of Indian Standards, testing and quality certification laboratories set up by SIDO state governments, etc. The Bureau of Indian Standard (BIS) has been developing standards for different manufactured products and it registers SSIs for adoption of quality standards as a measure of marketing support. SIDO has set up 4 Regional Testing Centres (RTCs) that provide testing facilities to SSI units as per BIS standards. In addition, there are 10 field – testing stations extending testing facilities and assistance to SSIs. SIDO is operating a scheme to reimburse (upto 75 percent subject to a maximum of Rs. 75,000) the cost of acquiring ISO 9000 Series quality certification. This scheme was taken up during the 9th Plan period and also to be continued during the 10th Plan period also.

Marketing Development Assistance Scheme: Ministry of Commerce, Government of India reimburses the expenditure incurred by SSI delegations that visit foreign countries (60 percent of the expenditure incurred by the delegation) for exploring marketing possibilities. This incentive is extended to admissible items only.

Training Programmes for Export packaging: SIDO, in partnership with the Indian Institute of Packaging, organises training programmes for SSI exporters on packaging for exports. Exporters are provided information on the latest packaging standards and techniques in order to boost exports.

Organizing Exhibitions and International Trade Fairs: For promoting exports, SIDO participates in selected international Trade Fairs and Exhibitions held aboard by the India Trade Promotion organization (ITPO). All expenses on space charges, display shipment, insurance, handling and clearance, publicity etc. are borne by the SIDO. Expenses incurred on transportation of SSI products (to and from Mumbai) are to be met by the participating SSI units.

Export Promotion Councils: The existence of export promotion Councils for specific industries provides the SSI member units with a platform for export marketing. A number of Export Promotion Councils are providing marketing support through procurement of direct orders and distribution of items among member units for production and sales. These Councils also arrange for testing quality of products, pre-shipment inspection, packaging and sales transactions assistance. Besides, these bodies arrange for participation of member units in various Exhibitions and Trade Fairs.

SIDBI's Marketing Finance & Development Department: SIDBI established its marketing Finance and Development Department (MFDD) in January 1996 to focus attention on marketing –related activities undertaken by the SSI sector. A special marketing Assistance Development Fund, with sub-allocation for women entrepreneurs has also been set up. In addition to above marketing inputs, a number of development and support services have also been undertaken by the Department to assist the marketing efforts of SSI units.

5.3 Legal Regulations

The regulation and promotion of industries constitutionally envisaged in such a manner that the industry sector forms a part of the concurrent list of the Constitution. The Industries (Development and Regulation) Act of 1951 is a Central Act under which small-scale industries have been defined. The Act / rules and regulations are formulated by various authorities at the Central Government level, State Government level and by local authorities. These legal regulations are further classified into:

- labour related issues,
- tax related issues,
- finance related issues,
- location related issues,
- product related issues
- environment related issues, and
- safety, security, hygiene, health and welfare related issues, etc

1.5.4 *Environmental Policies*

Environmental pollution in many cities and larger towns has been increasing rapidly. Pollution affects river water and land, besides polluting air and posing health risks to the inhabitants. Industrial units contribute to pollution through solid wastes, liquid effluents and gases. The inappropriate handling of industrial wasters creates problems for the human and natural environment. Increasing industrialisation without proper treatment of effluents has been considered a major cause of pollution. Further, poor working conditions in the SSIs are often cause of occupational health hazards. Small industries tend to cause more pollution due to inefficient production methods, inferior equipment, poor housekeeping and inability to adopt proper treatment technologies. In order to encourage cleaner production, the Government of India extends incentives like custom duty waiver, soft loans, etc. and provides other concessions for installation of pollution control equipment in industrial units.

1.5.4.1 Pollution Control Acts

There are two major statutes that govern water and air pollution control. The majority of SSI units in the country do not fall within the ambit of these pollution control laws. However, certain highly polluting industries are required to obtain a No Objection Certificate (NOC) prior to establishing a unit, even in the SSI sector.

The Water (Prevention and Control of Water Pollution) Act, 1974: The Act applies to all establishments discharging effluents into water or on land. A unit while making the project report is required to meet pollution control requirements and obtain an NOC (from State Pollution Control Board) before setting up the unit. The effluents so discharged have to be managed at all times or else there are penalty provisions under the Act for violations. Further, the unit sis not permitted to install any new or altered outlet for discharge of effluents / sewage into a steam or well, without prior consent of the Board. In a major initiative to reduce industrial water pollution, the Government of India in partnership with the World Bank (WB), Washington, has launched an Industrial Pollution Control Project for assisting clusters in setting up common effluent treatment plants.

The Air (Prevention and Control of Pollution) Act, 1981: The Act applies to all industries, which have to declare air pollution Control points and install necessary equipment. At the time of making the project report, provision has to be made for pollution control requirement and an NOC is to be obtained before establishing the unit. During operation of the unit, discharges into the air are to be managed within prescribed standards at all times, failing which penalty provisions are applicable.

As of 1992, SSIs have to obtain consent from the Central Pollution Control Board (CPCB) only in the case of 17 industries list below which have been categorised as highly polluting: (i) Fertilisers (Nitrogen/ Phosphate) (ii) Sugar (iii) Cement (iv) Fermentation and Distillery (v) Aluminium (vi) Petrochemicals (vii) Thermal Power (viii) Oil Refining (ix) Sulphuric Acid (x) Tanneries (xi) Copper Smelter (xii) Zinc Smelter (xiii) Iron & Steel (xiv) Pulp & Paper (xv) Dye & Dye Intermediates (xvi) Pesticides Manufacture and Formulation (xvii) Basic Drugs and Pharmaceuticals.

1.5.5 *Relocation Schemes*

For the purpose of relocating industries operating in residential / non-conforming areas and creating pollution, relocation schemes have been launched in some of the metropolitan cities like Delhi and Calcutta. These initiatives are expected to help improve environment management. During past years, entrepreneurs of small and tiny units started their units in metro cities even in non-conforming areas without obtaining statutory permissions from local authorities. These units have prospered due to vicini8ty of large markets, adequate transport and communication facilities, etc. Staff of local bodies also allowed to run these units either by overlooking them or sometimes going hand in gloves with the entrepreneurs. Because of substantial numbers of such units and their increasing pollution effect, use of electric power, etc, some environmental activists drew attention of the Supreme Court. The Supreme Court gave decision of relocating these polluting units to other industrial area equipped with pollution control facilities.

The Govt. of Delhi had to seal a large number of such polluting units resulting in closure of these units and displacement of labour, etc. The Govt. of Delhi has now made arrangements to make available industrial land in adjoining states for relocation of these units. Financial assistance is also provided to entrepreneurs. Such problems could also come up in other metros as well as large towns having concentration of SSI units. There is a need for taking corrective measures by state governments and local bodies so that Delhi episode is not repeated elsewhere. Such extreme positions disturb the SSI units, entrepreneurs, labour, etc. Both entrepreneurs and labour suffer, probably labour suffers more.

1.5.6 Infrastructural Facilities

Industrial Estates: The concept of industrial areas and development of plots and industrial sheds for allotment to the SSI entrepreneurs was initiated in 1955, as a Centrally Sponsored Programme to be implemented through Sate / UT Governments. The objective has been to attract entrepreneurs to set up small industries or to shift existing units to industrial areas provided with infrastructural facilities like water, electricity, developed roads, banks, canteens, watch and ward, communication facilities, etc. The other aim for creation of industrial estates was to encourage decentralised development in rural areas, develop sub-contracting relationships and establish common facility centres. This programme continued till 1979 with the assistance from Government of India and 796 industrial estates were established by then throughout the country. Thereafter, the Sates took over the activity of promoting industrial infrastructure and inducing SSIs to shift out of non-conforming areas to such developed areas. Additional facilities were extended by the different States for setting up new units as well as to those units which were moving out of non-conforming areas and relocating in the developed Industrial Estates / Areas. These facilities included subsidy on rent for factory accommodation, allOotment of sheds on hire-purchase or outright sales basis and other incentives like confessional charges for water and power, exemption from Sales Tax and Octroi Duty, etc.

Industrial Growth Centres: From the experience gained and feedback obtained from the industrial estates programme, there has been an increasing realisation that in addition to industrial area development, there should be supporting facilities, social infrastructure and suitable environment to achieve dispersed industrial growth. A selective approach was adopted to identify areas where economic and industrial activity was visible and where improving the existing infrastructure facilities could boost the pace of growth of SSI units further. Accordingly, Growth Centre approach was envisaged. The identification of growth centres was to be made on techno-economic considerations and new industrial areas / estates were to be located at growth centres. In 1988, Central government formulated a scheme of setting up to Growth Centres in different pars of the country to be implemented in collaboration with the Sate Governments and financial institutions. The growth centres were to accommodate both small scale and large-scale industries. Location conditions have been prescribed for establishment of Growth Centres.

The financing pattern for each Growth Centres comprises Central government equity of Rs. 10 Crores, State Government equity of Rs. 5 Cores, financial institutions share at (including Rs. 2 Crores as equity) Rs. 4 crore, Nationalised banks Rs. 1 core and market borrowings of Rs. 10 core. The total cost for the establishment of one such Centre has been stipulated at Rs 30 crore. In the sate of Arunanchal Pradesh, Goa, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Pondicherry and Tripura, the investment required may be different and could be determined taking into account special condition in these states. 71 growth centres are to be set up, out of which 68 centres have so far been approved.

Export Processing Zones: Export Processing Zones (EPZs) are special areas designated for providing export production or the processing of manufactured products at a low cost. Each EPZ has basic infrastructural facilities at reduced rates and other incentives like developed land sites, standard designed factory buildings, roads, power, water and drainage. Other provisions include banking, post offices, and custom clearing agents. Units located in EPZs are permitted to sell upto 25 percent of their value of production in the Domestic Tariff Area. The Government of India has established seven EPZs across the Country, The Kandla Free Trade Zone, the Santacruz Electronics Export Processing Zone and the Falta EPZ were setup in 1965, 1974 and 1984, respectively. The EPZs set up at Chennai, Cochin, Vishakapatnam and Noida are of more recent origin.

Industrial Parks: The new focus on specialised industrial clusters, both for domestic and export markets, is on the development of Industrial or Technology parks. In the year 1984, the Government of India formulated a Policy for computer hardware development, which led to the promotion of Electronics hardware Technology Parks (EHTPs). In 1986, the thrust Shifted towards computer software development, which resulted in a policy for the establishment of Software Technology Parks (STPs). The EHTPs and STPs operate under the Ministry of Information Technology, Government of India.

Integrated Infrastructure Development Centres: The scheme of setting up of integrated Infrastructure Development Centres (IIDCs) being pursued since 1994, aims at augmenting infrastructural facilities in the rural and backward areas with special emphasis on linkages between agriculture and industry. The scheme covers centrally developed backward districts other than those covered under the Growth Centres Scheme. The selection of site for an IID Centre is preceded by a comprehensive Industrial Potential Survey indicating proximity to the rail head and road links, availability of water, telecommunication facilities and potential for SSIs and tiny units. Thirty-two IID Centres have been so far approved by the government in various Sates / UTs.

Cluster Development Programme: SIDO has established technical support services through Product-cum-Process Development Centres to assist select clusters of SSI units for different specialised product lines. These Centres are located at Rancho (ceramic and glass industries); Agra (foundry); Merit (sports goods); Mamba (household electrical appliances); Ram agar in Uttar Prudish (electronic industries); Firozabad (glass industry); Kannauj (essential oils and perfume industry). Services of following nature are available at these centres: (i) Research and Development in the areas of dense industry clusters. (ii) Product design and innovation. (iii) Product and process improvement sand development of improved packaging techniques. (iv) Common facility services, and (v) Manpower development / training.

SIDBI also gives due emphasis on identifying the needs of the industry in terms of process technology, environment management, quality management, Common Facilities Centres, etc., and at initiating efforts to address these needs. The Bank identifies an implementing agency for each Cluster which, in turn, examines the specific aspects and provides Escort Services. SIDBI has so far extended assistance in about two dozen clusters and the product groups.

National Programme for Rural Industrialization: A National Programme for Rural Industrialisation (NPRI) has been announced in the Union Budget of 1999-2000 with a mission to set up 100 rural clusters every year to give a boost to rural industrialisation, in order to benefit the rural artisans and unemployed youth and reduce rural urban disparities. The programme is coordinated by SIDO. DVIC is expected to play an active role in marketing so that infrastructure available with DVIC could be optimally utilised for this programme.

2

Review of energy intensive small-scale industries in India

In order to identify small-scale industry sub-sectors which are important from the energy consumption point of view, a list of 41 energy intensive industry sub-sectors under the 4-digit NIC (National Informatics Centre) code was short-listed. To arrive at a national picture, a district wise breakup of the number of units under each of these 41 sub-sectors were obtained from the NIC Wing of DC (SSI).

Table 2.1 gives a consolidated list of the total number of units der each of the 41 selected sub-sectors on an all India basis as also their energy consumption and value of production. The importance of any industry sub-sector from energy point of view is a function of both its energy intensity and the total number of units within that particular sub-sector.

Table 2.1 Consolidated list of small-scale industries

4 digit NIC Code	Name of industry sub-sector	Total no. of units	Total energy consumption (000'Rs)	Total production (000'Rs.)
2021	Artificially dehydrated fruits	55	2618	49820
2023	Manufacture of fruit juice concentrate	217	5576	210601
2026	Canned fruit and vegetables	41	980	66029
2100	Manufacture of hydrogenated oil	166	13954	453554
2110	Manufacture of other edible oils and fat	16400	313443	20015998
2200	Industrial alcohol and blended spirit	39	7950	289318
2311	Spinning and weaving of cotton textiles	641	26250	1552097
2320	Dyeing and bleaching of cotton textiles	64	12366	192982
2420	Spinning, weaving and finishing of wool & silk	138	119	12116
2520	Dyeing/printing and bleaching of jute textiles	2	72	4914
2674	Manufacture of artificial leather	2	159	3324
2749	Manufacture of industrial goods	143	1208	67109
2801	Manufacture of pulp (machine made)	5	559	6120
2802	Manufacture of paper (machine made)	283	9132	214059
2903	Manufacture of industrial leather	207	6357	546195
2909	Manufacture of other leathers	35	549	17736
3002	Manufacture of tyre and tube for cycles	54	13208	294400
3101	Manufacture of heavy inorganic chemical	940	138768	3659312
3106	Manufacture of basic organic chemicals	133	14358	438791
3141	Manufacture of Toilet Soap	111	1853	197335
3169	Manufacture of fibre glass material	76	1061	61490
3181	Manufacture of explosives	20	447	39566
3201	Manufacture of fire bricks	122	27953	123681
3204	Manufacture of clay tiles	1015	149739	718980
3220	Manufacture of earthenware	306	3379	64385

4 digit NIC Code	Name of industry sub-sector	Total no. of units	Total energy consumption (000'Rs)	Total production (000'Rs.)
3231	Manufacture of chinaware	550	83069	260858
3232	Manufacture of sanitaryware	111	16253	81553
3233	Manufacture of insulators	84	6195	47260
3311	Manufacture of castings and forged iron	5547	768421	12647128
3316	Manufacture of Tools	111	2169	118439
3317	Manufacture of misc. foundry and forged products	289	8965	325258
3341	Manufacture of brass and rollings	90	2377	178784
3380	Processing of metal scraps	356	71093	2308250
3391	Melting and refining of other metal	120	3094	308418
3433	Manufacture of locks	565	4724	268528
3451	Manufacture of cutlery	273	1618	62731
3718	Manufacture of parts and accessories of locomotives	92	1688	99213
3728	Manufacture of parts and accessories of wagons	276	8630	342246
3746	Manufacture of automobile parts	367	12934	796853
3761	Manufacture of bicycles and frames	82	847	70973
3762	Manufacture of cycle rickshaws	92	115	27964

Based on the data, the casting and forging units were ranked first in this regard followed by manufacturers of edible oils and fats and manufacturer of glass tiles. These three sub-sectors combined, accounts for more than 70% of the total energy use within the 41 sub-sectors chosen for the present analysis. A pie chart showing the share of energy use by different SSI sub-sectors is given in Figure 2.1.

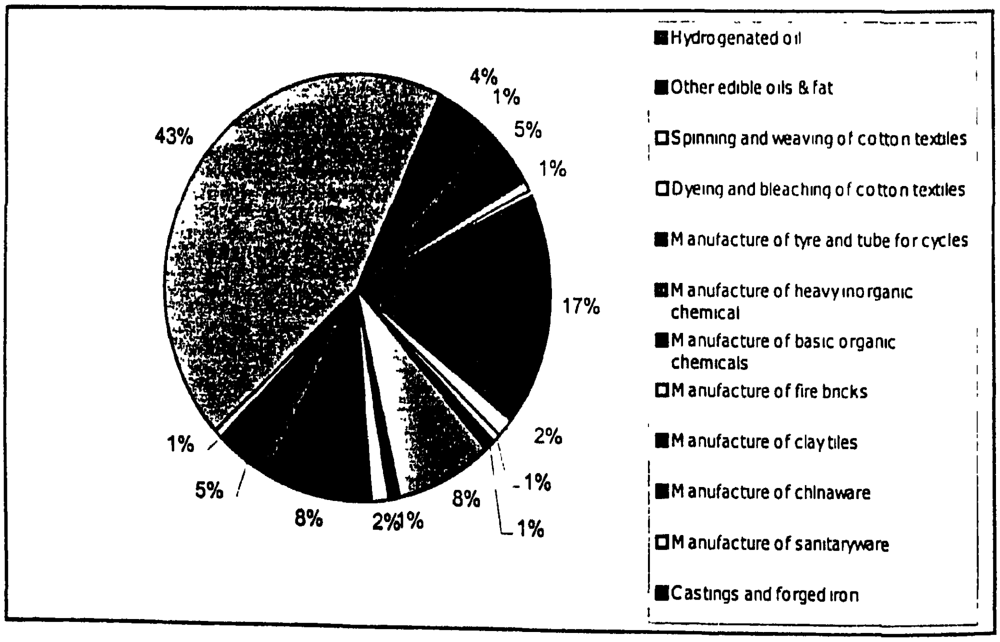

Figure 2.1 Energy consumption share of SSI sub-sectors

3 Potential clusters for development of CDM projects

3.1 The Mechanism and opportunities

The CDM (clean development mechanism), introduced in the Kyoto Protocol to the Framework Convention on Climate Change (FCCC), has been conceived as an international instrument to promote sustainable development in the DCs (developing countries) along with cost-effective climate change mitigation. The idea is to facilitate co-operative projects between developed and developing countries for GHG emissions (primarily carbon dioxide) reductions, with the former providing additional financial and/or technological inputs and the latter the opportunity for cost-effective emission reduction. Under CDM, actual credits or the "certified emission reductions (CERs) would be shared between the participating Parties.

The CDM brings together the need for Annex 1 (developed) countries to initiate investments in carbon emissions reductions, with the availability of low-cost carbon emissions reductions opportunities in non-Annex 1 (developing) countries. Through the process, enterprises in Annex 1 countries can, in partnership with enterprises in the DCs, invest in the establishment of state-of-the-art technologies in host developing countries. The lower technological baseline in the DCs would imply that such an investment would result in greater potential reductions in carbon emissions than would a similar investment in the Annex 1 country. In return for this investment, the Annex 1 country enterprise would seek returns in the form of a stream of carbon emissions reductions (as compared to host country baseline). This CDM process would thus be a more cost-effective mechanism for mitigating climate change than if the Annex 1 country enterprise had to implement an equivalent reduction at home. At the same time, the process would also drive a more rapid transfer of cutting-edge, climate-friendly technologies to the DCs. The process serves to underwrite the commercial risks associated with the introduction of new technologies through financial/technology flows from enterprises in Annex 1 countries, and to manage the technological risks through the need to ensure additional and sustainable reductions in carbon emissions over the project lifetime.

In order for the CDM mechanism to be effective in ensuring additional carbon emissions reductions, the transfer of cutting-edge, climate-friendly technologies is seen as essential. The rapid penetration of these technologies in the developing world would serve to seed these economies with such climate-friendly technologies, and thereby influence their widespread adoption in these rapidly growing economies. The introduction and adoption of energy-efficient technologies through the CDM process would initiate sector-wide competitive pressures for enterprises to select these technologies instead of conventional (less energy-efficient) technologies.

The process of this technological change would be similar to that of traditional models of technological up-gradation where productivity increase is the main driver. The CDM process would seed the market more rapidly, thus enhancing the rate at which the energy-efficient technologies are adopted in preference to the less-efficient technologies.

3.2 Pre-requisites for CDM projects

A number of pre-requisites are required in order to exploit the benefits from the CDM process that the developing countries hope for. Few aspects are of particular interest in this regard. Firstly, it would be in the interest of DCs to initiate the establishment of processes and procedures as well as institutions to start and absorb CDM activities. This would require a significant "CDM capacity" to be built up, both in government and in private enterprises. Furthermore, the transfer of CERs and the Annex-1 country investment in CDM projects requires both facilitation and negotiation. Human and institutional capacity development to enable this negotiation is, therefore, an important pre-requisite.

Secondly, CDM projects must address the sustainable development aspects of DCs, criteria of which have to be clearly defined by the DC governments. The attractiveness of CDM for host countries lies in its possibility to support the developmental process, and not in the occurrence of a few advanced-technology projects alone. The necessity to ensure high developmental spillover from CDM projects is, therefore, essential to the design of these projects.

Thirdly, technologies and practices that are well established or for which there is a well-developed market would not qualify as CDM interventions. This lack of market development could be due to low volumes, high costs, institutional and financial constraints, or other intangible barriers that raise the risk for investment. All CDM projects would introduce technologies in host countries for which markets are either poorly developed, or completely absent. Financial incentives provided through CDM projects could meet the higher costs of the new technologies, removal of market barriers, or transactions associated with market development.

Fourthly, a CDM project must clearly show the additionality factor to qualify itself under the mechanism. The key question is whether the intervention would occur in near future without the support provided by CDM funding. This, 'what-if', scenario analysis needs to be tightly circumscribed in scope so that the comparisons are made for scenarios where the institutional, financial, policy, and market conditions are the same as would face the CDM project. This is essential as the 'what-if' exercise could easily mushroom into multiple scenarios; a problem that always exists in disproving counterfactuals.

Finally, a CDM project must carefully choose and define baseline for calculation of the carbon emissions reductions. Baselines are the technology status or the situation that would have existed had the CDM project not been implemented, or the business-as-usual (BAU) scenario. These should be arrived at keeping in mind the sector assessment, regional/national development and the government's policy in the sector. It would be in the interest of the enterprises as well as the government to ensure that CDM is not used for dumping older technology and certain preconditions should also be incorporated in the evolution of baselines.

3.3 Potential sub-sectors/clusters

Following three sub-sectors/clusters have been identified as potential candidates for CDM interventions. The main features of these sub-sectors/clusters as well as the rationale behind selecting them are detailed out in the following section.

3.3.1 *Iron foundry*

The mass production of iron castings started in India in the 19th century. Today, there are about 7000 foundries in the country with an installed capacity of 3.5

MT (million tonnes), and production around 2.5 MT. These units are mostly located in clusters, with the cluster size varying from less than 100 to around 400 units. The energy intensity of these units is quite high, and presents an ideal situation where both energy savings and pollution reduction can be achieved through technological upgradation.

The Howrah belt of West Bengal has one of the oldest and the biggest cast iron foundry clusters in the country. Out of the 0.8 MT of grey iron castings produced per year in West Bengal, the Howrah cluster accounts for 0.5 MTPA (MT per annum), which is 20% of the total castings produced in the country. The export of castings from foundries in West Bengal is about 0.25 MTPA, valued at almost 25 billion rupees, and substantial growth in exports is possible. The Howrah cluster is the biggest exporter of castings in the country and is located near the port. A few units have also acquired the ISO 9000 certification. The cluster has a concentration of about 550 foundries within an area of 1467 square kilometres. Another 20–30 foundries are located at the periphery of the main cluster. It is estimated that about 30-40% of fuel saving potential exists in the cluster by way of implementation of new and energy efficient technologies. As an example of realisable fuel savings, DBC (Divided Blast Cupola) technology has been estimated to save about 35% in coke consumption over conventional cupolas operating in Howrah cluster. The summary of this estimation is shown in the above box.

Energy saving potential by implementation of energy efficient DBC technology in Howrah foundries

Number of foundries	550
Average production rate	5200 tons/year
Existing coke consumption	0.6 million tons/year
Existing CO2 emission	0.84 million tons
New coke consumption	0.39 million tons/year
Energy saving potential	35 per cent

Technological packages for upgradation is constrained by the lack of professional manpower in these units. The majority of foundries operating in Howrah cluster are managed by entrepreneurs and operated by persons who acquire skill through hands-on experience in the plant. The availability of skilled labour is dwindling. With increasing costs of production in the foundry, the resultant low-value-added castings do not bring in enough profit to enable the entrepreneur to invest in modernization and upgradation. At the same time, access to the adoption of appropriate credit is difficult because of the relatively high transaction costs of the process for these units.

The iron foundry sub-sector represents a case where technological development is not happening on its own. Despite the various efforts to accelerate technological progress within and beyond the Howrah cluster, the adoption of energy-efficient and environmentally-sounder technologies faces numerous technical, financial, and institutional constraints. These constraints are essentially related to the limited capacity of the units to identify, research, develop, and, absorb appropriate technologies as well as to access credit for their implementation. The overall purpose of the CDM projects in the cluster should, therefore, be to decrease transaction costs to users, and thus increase the financial attractiveness of such technologies for their wider adoption. The CDM intervention in this cluster could involve establishing delivery chains for credit and technology to the small-scale units.

3.3.2 Brick making

Common fired clay brick is one of the important building materials in India. Bricks are used as walling material in most residential and commercial buildings. They are also used for other applications, e.g. road and canal construction. India is the second largest producer of bricks in the world and is next to China in terms of brick production. The estimated brick production during the year 2000–01 was 140 billion. The brick production is estimated to be growing at a rate of 4% per year.

Indian brick industry is widely distributed all over the country, mostly located at village and rural enterprise levels. The sizes of brick units are much smaller in the rural areas. However, in peri-urban areas, the size of brick producing units is much larger, and clustering of brick making units is quite common. Regional variations are also observed in the size and scale of the brick production units. The total number of brick making units is estimated at around 100,000.

The technologies used for brick firing as well as the size (production capacities) of kilns vary between different regions. Traditional technologies are typically used for brick production. In general, bricks are hand moulded, sun dried and fired in a kiln. The entire process of brick making is manual and estimated to provide employment to 8 million workers.

Brick firing is an energy-intensive process. The annual estimated coal consumption in brick industry is 24 million ton, which forms about 8% of total coal consumption in India. Apart from coal, large quantity of bio-mass fuels is also consumed by the Indian brick industry. The share of fuel in total production cost of bricks is in the range of 35 to 50%. The total estimated expenditure on fuel by the Indian brick industry is in excess of one billion USD.

Overall, the industry is marred by inefficient use of energy and resources. A significant scope exists for improving the energy efficiency of the brick sector. It is possible to reduce energy consumption by about 30% with incremental improvements in existing technologies. It is estimated that baseline emissions of the brick industry is around 42 million tons of CO_2. As an example of fuel savings that are possible through technological interventions in this sector, VSBK (Vertical Shaft Brick Kiln) technology has been estimated to save about 29% in coke consumption over conventional BTK or clamps type of kilns having fixed or moving chimney. The summary of key figures pertaining to this estimation is shown in the above box.

Energy saving potential by implementation of energy efficient VSBK technology in the Indian brick industry

Number of kilns	90500
Brick production	144 billion/year
Coal consumption (conventional technologies)	24.2 million tons/year
Existing wood consumption	2.6 million tons/year
Total CO2 generation	41.6 million tons
Total fuel consumption (VSBK)	19 million tonnes of coal equivalent
Specific energy consumption (VSBK)	0.95 MJ/kg brick
Energy saving potential	29 per cent

Without technological, financial and institutional support, diffusion of energy and resource efficient technologies is expected to be very slow and may not be uniform. Similarly, introduction and diffusion of new kiln technologies and production of alternate building materials will not happen on its own. Another big challenge associated with technology upgradation and modernisation is related to development of technological capacity of the industry. The present level of technical skills of workers/operators in the brick sector is poor. The institutions are also weak and industry does not have sufficient financial resources to bring about the required change. In the baseline, it is expected that the process of change will be very slow. Given the fact the industry has limited financial and technological capacities, the change process will be governed largely by the rate and direction of support provided by different national and bilateral programmes to upgrade and modernise the brick industry.

Brick industry provides major inputs to the construction industry. Majority of the brick production is dependent on traditional kilns operating in unorganised small-scale sector. The brick industry is energy inefficient and is also responsible for local air pollution and topsoil degradation. The industry was stagnant on energy and environmental fronts over the years. In order to ensure sustainable supply of bricks in the future, it is imperative to improve the operations of these traditional industries, besides introducing new products and processes in the brick-making sector.

3.3.3 *Ceramic industry*

Ceramic tiles and sanitary wares form an important input to the modern construction industry. Typical application of ceramic tiles in the construction sector ranges from flooring tiles, decorative tiles, wall tiles, etc. Similarly, use of sanitary ware is indispensable in the modern construction industry. Average growth rate of the tile and sanitary ware industry has been around 10% in past few years. With growing urbanisation and with increasing use of ceramic tiles and sanitary ware in Indian construction sector, it is expected that this industry will keep meeting the growing needs in this sector.

Manufacturing of ceramic tiles and sanitary wares takes place in both large and small-scale units. Total national production of ceramic tiles in India is more than 1.5 million tonnes. Approximately 50% of the annual national production is accounted for by the small-scale sector. For sanitary ware, total national production is in excess of 0.3 million tonnes. Around half of this production comes from the small-scale units.

In large-scale, there are around 6-7 large firms each in the tile and sanitary ware industries that account for around 50% national production. These firms have several large-scale manufacturing plants in different parts of the region and incorporate state of art technologies. Most of these units were set up in technica collaboration with leading ceramic tile/sanitary ware manufacturers in the world. For example, Kajaria Ceramics Ltd (KCL) was established in 1988 with an installed capacity of 12,000 tonnes per annum in technical collaboration with Todagress S.A. of Spain – a world leader in floor/wall tiles. Similarly, Johnson's is an internationally reputed multinational company manufacturing ceramic tiles in India. These firms are financially well off and are capable of investing in modernisation and upgradation.

Small-scale industry has an important role to play in the overall development of the ceramic industry in the country. In small-scale, ceramic tiles and sanitary wares are produced mainly in Gujarat. There are around 100 small-scale units manufacturing ceramic tiles and sanitary ware in Gujarat. Most of these small-scale units in Gujarat are located in different clusters at Morvi, Than, Himmatnagar and Naroda (Ahmedabad). There are around 70-80 units manufacturing ceramic tiles in the Morvi cluster. Apart from this there are around 20-30 units making ceramic tiles in other nearby clusters (Than and Himmatnagar) in Gujarat. Few small-scale units ceramic tile units are also operating in Maharashtra, Rajasthan, and Madhya Pradesh. However, the number of small-scale units in these states is low compared to that in Gujarat. The ceramic cluster at Than is mainly populated by small-scale sanitary ware industry. Industry estimates point out that there are around 80-90 sanitary ware units operational in this cluster. There are around 10 sanitary ware units also operating in Morvi cluster.

The small-scale ceramic tile and sanitary ware units are characterized by energy inefficient operations and low awareness about energy efficiency options. These units usually do not have enough capacity to upgrade their production process and adopt energy efficient technological options. Moreover, off-the-shelf technological options are not available to these units to conserve energy. There is also lack of enabling environment (in terms of human and institutional development) to promote energy efficiency in these industries. In terms of energy efficiency, there is scope to reduce the specific energy consumption (around 10%) in the

As an example of bringing out energy saving potential that is possible by way of energy efficient technologies adoption in the ceramic industry, a case of adoption of Tunnel Kilns (TKs) could be considered in place of conventional Down-Draft Kilns (DDKs). There are about 200 DDKs operating in a ceramic industry cluster of Khurja, near Delhi. These conventional kilns typically have specific energy consumption of about 6800 kCal/kg of fired product. The CO_2 emissions from these kilns amount to about 19,500 tons in a year. The energy-efficient Tunnel Kilns, on the other hand, have a much lesser fuel consumption, typically in the range of 1700 kCal/kg of fired product, and consequently lesser CO2 emissions. If Tunnels Kilns could replace all the Down-Draft Kilns operating in the cluster, a fuel saving of 25-30% is achievable.

existing process technology by incorporating incremental changes in technology, adoption of energy efficient devices and better housekeeping measures.

From the perspective of regional development, small-scale ceramic clusters in Gujarat contribute to local economic growth and provide employment opportunities for many in the region. In addition to the sanitary ware and tile units, there are a number of units that make stoneware crockery. Intervention in the sanitary ware and tile industries will therefore have a potential for spill over benefits in other industries in the clusters as well.

In the baseline it is expected that units will keep operating in the same manner. Lack of technological capacity of the units will be a barrier to improve their technological performance and progressively improve their energy consumption. Inefficient operation of units will result in lot of energy being wasted in the cluster resulting in higher production costs and higher environmental damage (in terms of GHG emissions). The CDM intervention in the sub-sector will focus on developing technological and institutional capacity for upgradation and modernisation of these small-scale units with special significance to replication/spill over benefits and incremental technological changes.

4

Conclusion

The Kyoto Protocol represents a major global initiative to alter technological dynamics. The international discussions and negotiations leading to the Kyoto Protocol, and since, reflect a desire to provide a global policy push to institutionalise, and later internalise, the preferential adoption of low or zero carbon technologies.

In the developing countries, which would be the host countries for CDM projects, this desire is expressed in an expectation that the CDM process would help facilitate the early introduction of advanced technologies that could promote sustainable development. It is important to note that the developing countries would like the CDM process to help move the development process itself on to a low carbon path. Consequently, the hope is that the basic building blocks of development infrastructure (in education, health, telecommunications etc) move towards climate-friendlier alternatives. In the process, the benefits of the CDM process would help mitigate climate change, as well as provide large multiplier effects.

It is this multiplier effect that holds a much greater attraction for developing countries than the individual projects themselves. These multiplier effects could be direct benefits such as the replication of advanced technology interventions so that, ultimately, the advanced technology becomes the mainstream technology, and the availability of an additional financing mechanism. Indirect benefits could include local environmental benefits, employment generation, and the increased capacity of host country entrepreneurs to link to global markets and to initiate and manage technological change. As an additional benefit, over the longer term, the increasing institutionalisation of technological change within the host countries themselves could also lead to easing of the balance of payments problems.

In this context, Indian SSIs, which are diverse, multi-sectoral entities and that have issues both unique to themselves and cutting across multiple sectors, CDM, in its present form, poses a mixed atmosphere of fear and opportunity. Given the pation in the complex international financing and technology sms, and their poor self-capacity to modernize technology to impro ct quality and reduce production cost on their own, the chances of any wide scale technology up-gradation are severely restricted. It would, therefore, be in the interest of small-scale industry to take proactive stand and start establishment of processes and procedures to initiate CDM activities and to build up sufficient CDM capacity in project stakeholders (e.g., governments, enterprises, industry associations, consultants, etc.). Capacity building needs are quite diverse and include understanding the complex nitty-gritty of the mechanism, and actions on managing projects (technology, finances, monitoring and verification exercises, CERs trading, baseline, additionality and sustainable development approvals, etc.) according to the specific requirements of the mechanism. Establishing and managing an information base on sector benchmarks, and establishing of national legal entities and institutions would also be required to implement the CDM projects in SSIs.

Further detailed investigation, however, would be needed to estimate the CO_2 abatement potential and costs based on detailed diagnostic study of industry clusters, and to analyse the applicability of the chosen clusters from CDM ability point of view.